



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/554,203

11/03/2006

Akira Otomo

32011-224703

2851

26694

7590

01/16/2009

VENABLE LLP

P.O. BOX 34385

WASHINGTON, DC 20043-9998

EXAMINER

PURINTON, BROOKE J

ART UNIT

PAPER NUMBER

2881

MAIL DATE

DELIVERY MODE

01/16/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/554,203	Applicant(s) OTOMO ET AL.	
	Examiner Brooke Purinton	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 14-37 is/are rejected.
- 7) ☒ Claim(s) 10-13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/24/2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/3/2006 & 10/24/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Claims 10-13 re objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The restriction requirement previous, as set forth in the Office action mailed on 10/16/2008, has been reconsidered in view of the allowability of claims to the elected invention pursuant to MPEP § 821.04(a). **The restriction requirement is hereby withdrawn as to any claim that requires all the limitations of an allowable claim.** Claim 24-37, directed to a probe with a branching/dendrimer structure are no longer withdrawn from consideration because the claim(s) requires all the limitations of an allowable claim.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Drawings

The drawings are objected to because the figure numbers are not in English (that is, the word that is presumably “figure” is not in English in the drawings). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings

Art Unit: 2881

for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

Paragraph 28 – "fist molecule" should be "first molecule".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 8, 18 and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the outside" in line 4. There is insufficient antecedent basis for this limitation in the claim. The outside of what?

The term "binding residue" in claim 1 and claims 18 and 21-23 is a relative term which renders the claim indefinite. The term "binding residue" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The specification only defines some preferred types of binding residue, but not what binding residue is.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "is" in claim 8 is used by the claim to mean "is

Art Unit: 2881

imparted by”, while the accepted meaning is “is the same as.” The term is indefinite because the specification does not clearly redefine the term. External energy can be imparted by light, electrons or ions. But ions and electrons are not energy themselves, and are matter/molecules.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 -5, 7 and 20 are rejected under 35 U.S.C. 102(b) as being taught by Nakagawa et al. (USPAPN 2002/0271038).

Regarding Claim 1, Nakagawa teaches a probe comprising: a support (Figure 6, part 1); and an intermediate excitation medium (Figure 6 parts 62/63), which is fixed on said support and is excited when external energy is supplied from the outside (Figure 6, part 65, potential being applied), and which causes a first molecule in the vicinity thereof having a binding residue to achieve binding with a binding target which is to be bound to said first molecule (Figure 6, part 68, reaction portion).

Regarding Claim 2, Nakagawa teaches the probe according to Claim 1, wherein either both or one of said first molecule and said binding target is fixed to a support member (Figure 6).

Regarding Claim 3, Nakagawa teaches the probe according to Claim 2, wherein said support is positioned with sufficient accuracy with respect to said support member so as to allow said binding (Figure 6).

Regarding Claim 4, Nakagawa teaches the probe according to Claim 3, wherein the accuracy is 1 nm or less ([0029], “intended molecule”, also, Figure 6, DNA as target molecule, on nanoscale, meaning accuracy in angstroms).

Regarding Claim 5, Nakagawa teaches the probe according to Claims 1, wherein, when said intermediate excitation medium is excited, said intermediate excitation medium generates binding energy

Art Unit: 2881

which moves from said intermediate excitation medium in an excited state to said first molecule to achieve said binding (Figure 6, transferred via part 67).

Regarding Claim 7, Nakagawa teaches the probe according to Claim 1, wherein, when said intermediate excitation medium is excited, said binding is accomplished based on electron transfer between said intermediate excitation medium in said excited state and said first molecule (choosing appropriate reactions by choosing functional group, implicit in [0076]).

Regarding Claim 18, Nakagawa teaches a probe according to Claim 1, wherein said binding target is a second molecule having a binding residue (Figure 6, part 64).

Regarding Claim 20, Nakagawa teaches the probe according to Claim 1, wherein said intermediate excitation medium is fixed to said support by chemical bonds (“covalent bond” [0048])

Claims 24-37 are rejected under 35 U.S.C. 102(b) as being taught by Benters et al. (“Dendrimer activated solid supports for nucleic acid and protein microarrays.”).

Regarding Claim 24, Benters teaches a probe comprising: a support (Scheme 1, part b, part labeled support); and a molecule (molecule on support in Scheme 1) which is fixed on said support and which interacts physically with a probe scanning target (target is physically spotted on support, page 691, column 1, paragraph 2) wherein said molecule comprises a probe branch that forms the end of said probe and a plurality plural number of binding bonding branches extending radially from the tip of said probe branch on the support side to be fixed by selective binding adsorption to said support (page 688, column 1, paragraph 1, used for DNA oligomers).

Regarding Claim 25, Benters teaches probe comprising; a support (scheme 1, part b); and a molecule which is fixed on said support and which interacts chemically with a probe scanning target (chemical coupling, page 691, column 1, paragraph 2), wherein said molecule comprises a probe branch that forms the end of said probe and a plurality plural number of bonding branches extending radially from the tip of said probe branch on the support side to be fixed by selective adsorption binding to said support (dendrimer structure as disclosed by title, Scheme 1, page 688, column 1, paragraph 1, used for DNA oligomers).

Art Unit: 2881

Regarding Claim 32, Benters teaches a probe comprising: a support; and an active molecule which is fixed so as to protrude from said support and which acts physically on a probe scanning target (target is physically spotted on support), wherein said active molecule comprises a probe branch that forms the end of said probe and a plurality plural number of binding bonding branches extending radially from the tip of said probe branch on the support side (Scheme 1) to be fixed by selective adsorption binding to said support (page 688, column 1, paragraph 1, used for DNA oligomers).

Regarding Claim 33, Benters teaches a probe comprising: a support; and an active molecule which is fixed so as to protrude from said support and which acts physically on a probe scanning target (target is physically spotted on support), wherein said active molecule has a dendrimer structure (title, dendrimer activated).

Regarding Claim 27 and Claim 34, Benters teaches the probe according to Claim 24/32, wherein said probe branch and said binding bonding branches have different structures, and said plurality of binding bonding branches branch radially from said tip of said probe branch, forming a tree-like structure with said probe branch as a trunk (Scheme 1, parts b, with different structures of R shown).

Regarding Claim 28 and Claim 35, Benters teaches the probe according to Claim 27/32, wherein said active molecule has a dendrimer structure (title, dendrimer activated, as well as activation step in Scheme 1).

Regarding Claim 29 and Claim 36, Benters teaches the probe according to Claim 32, wherein one molecule of said active molecule is fixed on said support (Scheme 1).

Regarding Claim 30, Benters teaches a probe according to Claim 24, wherein said probe scanning target is a molecule (biomolecules, page 687, Column 2, paragraph 1).

Regarding Claims 31 and Claim 37, Benters teaches a probe according to claims 24 and 32 wherein said active molecule is fixed to said support by chemical bonds ("covalently attach the dendrimer" page 689, Column 1, paragraph 2, last line).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2881

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanagawa as applied to claim 5 above and further in view of Fagnoni et al. ("Radical addition to Alkenes via electron transfer photosensitization,").

Regarding Claim 6, Nakagawa teaches the probe according to Claim 5.

He fails to explicitly teach wherein movement of said binding energy from said intermediate excitation medium in said excited state to said first molecule is excited triplet energy transfer.

Fagnoni teaches wherein a movement of binding energy from an excitation medium in an excited state to a first molecule is excited triplet energy transfer (type of transfer known in reactionary processes via molecular reaction (photo induced or through catalytic reactions), page 7880, column 2, paragraph 2).

Modification would have entailed movement of said binding energy from said intermediate excitation medium in said excited state to said first molecule is excited triplet energy transfer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to

Claims 8,9, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanagawa as applied to claim 1 above and further in view of Fuchs et al. (USPN 5298760).

Regarding Claim 8, Kanagawa teaches the probe according to Claim 1.

He fails to explicitly teach wherein said external energy is light, electrons, or ions.

Fuchs teaches a probe for location selective catalytic reactions wherein an external energy is imparted by light in order to carry out a reaction so that it occurs in a specific location (3, 20-25).

Modification would have entailed using this photoinduced reaction either in addition to (as Fuchs does, adding this technique to voltage pulses, 3, 30), or instead of, the voltage of Nakagawa.

It would have been obvious to one of ordinary skill in the art at the time of the invention to make such a modification since Fuchs state that the light will allow the location to be very specifically chosen (3, 25-27).

Regarding Claim 9, Kanagawa and Fuchs teach the probe according to Claim 8.

Art Unit: 2881

Fuchs further teaches wherein an intermediate excitation medium is a photosensitized molecule (“initiated by irradiation,” meaning the an excitation medium is photosensitive), and said external energy is said light (“light” 3, 23).

Motivation is the same as given above.

Regarding Claim 15, Nakagawa and Fuchs teach the probe according to Claim 9.

The modification of Nakagawa by Fuchs makes obvious wherein one molecule of said photosensitized molecule is fixed on said support, since Nakagawa teaches where the molecule is fixed on said support (catalyst of Figure 6) and the modification of Claim 9 utilizes photosensitized molecules, therefore being fixed on said support.

Motivation is the same as given above.

Regarding Claim 16, Nakagawa and Fuchs teach the probe according to Claim 8.

Fuchs further teaches wherein said intermediate excitation medium is a photocatalyst and said external energy is said light (3, 20-25).

Motivation is the same as given above.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa and Fuchs as applied to claim 9 above and further in view of Mizutani et al. (USPAPN 2002/0106581).

Regarding Claim 14, Nakagawa and Fuchs teach the probe according to Claim 9.

They fail to teach wherein said photosensitized molecule is an N-acetyl-4-nitro-l-naphthylamine derivative.

Mizutani discloses using an N-acetyl-4-nitro-l-naphthylamine derivative as a photon sensitive compound ([01780]).

Modification would have entailed using an N-acetyl-4-nitro-l-naphthylamine derivative as a photon sensitive compound in the apparatus of Nakagawa and Fuchs.

It would have been obvious to one of ordinary skill in the art at the time of the invention to make such a modification since such a derivative would have been known in the art to absorb certain spectrums. Modification would have yielded the predictable results of substituting one photosensitized molecule (an N-acetyl-4-nitro-l-naphthylamine derivative) for another (the one taught by Fuchs).

Art Unit: 2881

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa and Fuchs as applied to claim 16 above and further in view of Cermenati et al. ("Solar light induced carbon carbon bond formation via TiO₂ photocatalysis").

Regarding Claim 17, Nakagawa and Fuchs teach the probe according to Claim 16.

They fail to explicitly teach wherein said photocatalyst is titanium dioxide.

Cermenati et al. teach titanium dioxide as a photocatalyst (title).

Modification would have entailed using TiO₂ as a photocatalyst in the probe of Nakagawa and Fuchs.

It would have been obvious to one of ordinary skill in the art to make such a modification since it is "inexpensive, chemically stable and atoxic semiconductor which absorbs all of the UV component of the solar spectrum" (page 80-5, column 1, paragraph 1).

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagawa as applied to claim 1 above and further in view of Resch et al. ("Building and Manipulating Three Dimensional and Linked Two-Dimensional Structures of Nanoparticles Using Scanning Force Microscopy," Langmuir, Nov. 10 1998).

Regarding Claim 19, Kanagawa teaches the probe according to Claim 1.

He fails to teach wherein said binding target is a material body other than a molecule.

Resch teaches using a probe for a SFM to manipulating nanoparticles (a material body other than a molecule) (page 1, introduction).

Modification would have entailed using the probe of Kanagawa to have a binding target that is the nanoparticle of Resch.

It would have been obvious to one of ordinary skill in the art at the time of the invention to make such a modification since it would allow greater usefulness, and allow the probe to be used in many different processes. Choosing the intermediate excitation medium such that it can interact with the nanoparticle would be a routine matter of experimentation for one of ordinary skill in the art.

Art Unit: 2881

Allowable Subject Matter

Claims 10-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter/allowance:

The prior art taken singularly or in combination fails to anticipate or fairly suggest the limitations of the independent claims, in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper.

In regard to claims 10-13, the prior art taken either singly or in combination fails to anticipate or fairly suggest a probe with a molecule with a probe branch that forms the end of said probe and a plural number of bonding branches extending radially from the tip of said probe branch on the support side to be fixed by selective adsorption to said support (i.e. structured so as to be termed a dendrimer structure); recited together in combination with the totality of particular features/limitations recited therein.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure is listed in the notice of references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brooke Purinton whose telephone number is 571.270.5384. The examiner can normally be reached on Monday - Friday 7h30-5h00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on 571.272.2293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2881

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jack I. Berman/
Primary Examiner, Art Unit 2881

Brooke Purinton
Examiner
Art Unit 2881/B. P./
Examiner, Art Unit 2881